



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/581,771	06/06/2006	Peter Georg Baum	PD030120	8564
24498	7590	06/17/2009		
Thomson Licensing LLC			EXAMINER	
P.O. Box 5312			BORSETTI, GREG	
Two Independence Way				
PRINCETON, NJ 08543-5312				
			ART UNIT	PAPER NUMBER
			2626	
			MAIL DATE	DELIVERY MODE
			06/17/2009 PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/581,771

**Applicant(s)**

BAUM ET AL.

**Examiner**

GREG A. BORSETTI

**Art Unit**

2626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 June 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-893)  
Paper No(s)/Mail Date 6/6/2006.

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. Claims 1-8 are pending.

#### ***Information Disclosure Statement***

2. The Information Disclosure Statement (IDS) submitted on 6/6/2006 is in compliance with the provisions of 37 CFR 1.97.

#### ***Drawings***

3. The drawings filed on 6/6/2006 are not accepted by the examiner for the following informalities. The Examiner requests that the abbreviations provided in Figs. 1-2 either be spelled out within their corresponding boxes or defined in a legend such that a person viewing the drawing can easily interpret the functions of the flow chart.

#### ***Specification***

4. The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

#### **Arrangement of the Specification**

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
- (e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A

COMPACT DISC.

(f) BACKGROUND OF THE INVENTION.

(1) Field of the Invention.

(2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.

(g) BRIEF SUMMARY OF THE INVENTION.

(h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).

(i) DETAILED DESCRIPTION OF THE INVENTION.

(j) CLAIM OR CLAIMS (commencing on a separate sheet).

(k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).

(l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

To better comply with US practice, the Examiner requests that the specification use the above subsection titles. In the instant application, for example, Page 2, lines 23, recites Invention, this should be rewritten to be Brief Summary of the Invention. The other subsection titles should be rewritten accordingly.

***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claim(s) 1-4 are rejected under 35 USC 101 for being nonstatutory. Under the most recent interpretation of the Interim Guidelines regarding 35 U.S.C.101, a method claim must (1) be tied to another statutory class or (2) transform underlying subject matter to a different state or thing. If no transformation occurs, the claim(s) should positively recite the other statutory class to which it is tied to qualify as a statutory

process under 35 U.S.C. 101. As for guidance to areas of statutory subject matter, see 35 U.S.C. 101 Interim Guidelines (with emphasis of the Clarification of "processes" under 35 USC 101); As an example, the claim(s) could identify the apparatus that accomplishes the method steps, or positively recite the subject matter that is being transformed.

As per independent claim 1, the claim may be interpreted as a human performing the calculations for modulating said watermark data bits on an encoder pseudo-noise sequence, manually performing a time to frequency transform and masking the watermark data bit information to a mask level of an audio signal, manually performing an inverse transform, combining the pseudo-noise time domain sequence with a current frame of data in the audio signal with a given number of orthogonal encoder pseudo-noise sequences per signal frame for combining corresponding sections of said current frame, and writing down the corresponding data.

As per independent claim 2, the claim may be interpreted as receiving an audio signal waveform, synchronizing the waveform, convolving the frames of data with a corresponding one of time-inversed versions of the N orthogonal encoder pseudo-noise sequences, and determining a bit value from the sign of the peak or peaks of the resulting signal for each of said frames.

As per independent claim 3, the claim may be interpreted as receiving an audio signal waveform, synchronizing the waveform, determining one or more echos and their related delays, constructing a modified decoder pseudo-noise sequence based on the time-inversed version of the encoder pseudo-noise sequence whereby the modified

pseudo-noise sequences are constructed by time-shifted versions of the time-inversed encoder sequences according to the corresponding echo delays, convolving the frames of data with a corresponding one of time-inversed versions of the N orthogonal encoder pseudo-noise sequences, and determining a bit value from the sign of the peak or peaks of the resulting signal for each of said frames.

Dependent claim 4 depends on independent claim 3 and fails to further clarify tie the method to another statutory category of invention or provide a transformation.

6. Although claims 5-8 recite insert apparatus type elements, these elements are disclosed in the specification (Page 9, lines 26-36 and Page 11, lines 26-36) as stages, which the Examiner contends when treated as a whole, claims 5-8 are more toward a non-statutory (software algorithm) embodiment and not necessarily a hardware embodiment.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 2 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by LoboGuerro et al. (NPL Document "Iterative Informed Audio Data Hiding Scheme Using Optimal Filter")

As per claim 2, LoboGuerro teaches:

receiving and synchronising said transmitted or transferred audio signal;  
(Fig. 3, The reception side receives the signal and synchronization is performed.)

convolving each one of a corresponding section of said current frame of data of said audio signal with the corresponding one of time-inversed versions of the N orthogonal encoder pseudo-noise sequences; (Page 1409, column 1, ...*The detection is then computed by convolution of the received signal (sent signal + channel noise) with the Optimal Filter...* the filter is a matched filter, which is a time-inversed version of the transmitted (pseudo-noise) sequence.)

determining, for each one of said sections, from the sign of the peak or peaks of the corresponding convolution result the value of a bit of said watermark data. (Page 1409, equation 4)

Claim 6 is the apparatus claim for which claim 2 is the method claim. Since the means plus function language is drawn to modules for performing the method, Claim 6 is rejected for the same reason as claim 2.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gomes et al. (NPL document "Resynchronization methods for audio watermarking") in view of Jones et al. (US Patent #7460991)

As per claim 1, Gomes teaches:

modulating said watermark data bits on an encoder pseudo-noise sequence;

(Fig. 2, Modulator)

transforming said modulated encoder pseudo-noise sequence into the frequency domain and shaping it in amplitude according to the masking level curve of an audio signal together with which the watermark data bit information is to be transmitted or transferred, and transforming said shaped encoder pseudo-noise frequency domain sequence back into the time domain; (Fig .2,  $H(f)$ , psychoacoustic model, also

Page 3, ...*To guarantee inaudibility of the watermark,  $v(n)$  is frequency-shaped to fit a masking threshold obtained from a psychoacoustic model...*)

combining said inverse transformed encoder pseudo-noise frequency domain sequence with a current frame of data of said audio signal, (Fig .2,  $w(n)$  is added to  $x(n)$ )

transmitting or transferring said combined audio signal frame or frames carrying said watermark data bits. (Fig. 2,  $y(n)$ )

Gomes fails to fully teach, but Jones teaches:



wherein the length of said encoder pseudo-noise sequence is one Nth of the length of a frame of said audio signal, N being an integer number greater one, wherein N orthogonal encoder pseudo-noise sequences are used per frame of said audio signal for carrying out said combining for corresponding sections of a current frame; (Gomes teaches that the pseudo-noise sequences are orthogonal, Page 3, ... *These vectors are normally distributed and orthogonal*... However, Gomes fails to specifically teach that there are more than one pseudo-noise sequences per frame, Jones, column 5, lines 14-22, teaches that there a data frame corresponds to complete cycles of the pseudo-noise codes PN1 and PN0.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Jones with Gomes so that the decoder can self synchronize itself with the data sequence (column 5, lines 21-22).

Claim 5 is the apparatus claim for which claim 1 is the method claim. Since the means plus function language is drawn to modules for performing the method, Claim 5 is rejected for the same reason as claim 1.

9. Claims 3 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over LoboGuerro et al. (NPL Document "Iterative Informed Audio Data Hiding Scheme Using Optimal Filter") in view of Jones et al. (US Patent #7460991) and further in view of Papasakellariou et al. (US Pre-Grant Publication #20030067968)

As per claim 3, LoboGuerro teaches:

receiving and synchronising said transmitted or transferred audio signal;  
(Fig. 3, The reception side receives the signal and synchronization is performed.)

convolving each one of a corresponding section of said current frame of data of said audio signal with the corresponding one of time-inversed versions of the N orthogonal encoder pseudo-noise sequences; (Page 1409, column 1, ...*The detection is then computed by convolution of the received signal (sent signal + channel noise) with the Optimal Filter...* the filter is a matched filter, which is a time-inversed version of the transmitted (pseudo-noise) sequence.)

determining (DRECMF), for each one of said sections, from the sign of the peak or peaks of the corresponding convolution result the value of a bit of said watermark data. (Page 1409, equation 4)

LoboGuerro fails to fully teach, but Jones teaches:

there are more than one pseudo-noise sequences per frame  
(Jones, column 5, lines 14-22, teaches that there a data frame corresponds to a complete cycles of the pseudo-noise codes PN1 and PN0.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Jones with LoboGuerro so that the decoder can self synchronize itself with the data sequence (column 5, lines 21-22).

LoboGuerro and Jones fail to fully teach, but Papasakellariou teaches:

determining in the received audio signal one or more echoes and the related echo delays; (¶ 0023, ...*The delay and channel medium information for each multipath are typically obtained as a byproduct of the signal detection process (e.g. a Rake receiver is already provided with delay and channel medium estimates for each multipath)...*)

assembling together the N time-inversed versions of said orthogonal encoder pseudo-noise sequences and constructing a modified decoder pseudo-noise sequence based on the time- inversed version of said encoder pseudo-noise sequence whereby, according to the echo delay or delays determined, correspondingly time-shifted versions of said time-inversed encoder pseudo-noise sequence are combined in order to construct said modified decoder pseudo-noise sequence; (LoboGuerro teaches the N time-inversed orthogonal pseudo-noise sequences. Jones teaches the framing. Papasakellariou further teaches that multipath delays are used to determine time delays which are combined to produce the original signal without interference, abstract.

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Papasakellariou with LoboGuerro and Jones to take channel and multipath interference into consideration for spread spectrum transmission to produce more accurate signal at the receiver by cancelling interference caused by the medium and multipath.

Claim 7 is the apparatus claim for which claim 3 is the method claim. Since the

means plus function language is drawn to modules for performing the method, Claim 7 is rejected for the same reason as claim 3.

10. Claims 4 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over LoboGuerro et al. (NPL Document "Iterative Informed Audio Data Hiding Scheme Using Optimal Filter") in view of Jones et al. (US Patent #7460991) and further in view of Papasakellariou et al. (US Pre-Grant Publication #20030067968) and further in view of Woo et al. (US Pre-Grant Publication #20050002481)

As per claim 4, claim 3 is incorporated and LoboGuerro, Jones, and Papasakellariou fail to specifically teach, but Woo teaches:

when determining in the received audio signal one or more echoes and the related echo delays, the results for several audio frames are evaluated before a final result on the echo delay is formed. (¶ 0065, ...a narrower window time frame may subsequently be used in the windowing filters without a possibility of failing to detect the chip transition in the message received in the line of sight path. Use of narrower time frames in the windowing filters results in rejection of more multipath signals, as the minimum time delay (and corresponding path length) that can be rejected decreases... Woo teaches an adaptive , updating time delay estimation where it would have been obvious to someone of ordinary skill in the art at the time of the invention that since it is an updated delay, it could use information from more than one audio frame to update the expected echo

delay.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Woo with LoboGuerro, Jones, and Papasakellariou so that multipath echo delays could have been compensated for that have a delay longer than the period of one audio frame.

Claim 8 is the apparatus claim for which claim 3 is the method claim. Since the means plus function language is drawn to modules for performing the method, Claim 8 is rejected for the same reason as claim 3.

### ***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Refer to PTO-892, Notice of References Cited for a listing of analogous art.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to GREG A. BORSETTI whose telephone number is (571)270-3885. The examiner can normally be reached on Monday - Thursday (8am - 5pm Eastern Time).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, RICHEMOND DORVIL can be reached on 571-272-7602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Greg A. Borsetti/  
Examiner, Art Unit 2626

/Talivaldis Ivars Smits/  
Primary Examiner, Art Unit 2626

6/10/2009